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## CO-OPERATION OF SCHOOL AND SHOP IN PROMOTING INDUSTRIAL EFFICIENCY

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The National Society for the Promotion of Industrial Education was organized at Cooper Union in November, 1906. It has held three annual conventions and has established branches in different states, and the movement has already made itself felt in more states than one in leading to legislation providing for industrial training in the public schools.

As a result of increased interest in industrial education various organizations have appointed committees to deal with the matter. In April, 1908, the Chicago branch of the National Metal Trades Association appointed a committee on industrial education. As the director of the Lewis Institute I was invited to meet with the committee and consider the question of what might be done to provide competent workmen for the shops in Chicago.

We agreed that we should profit by the experience of Germany and see to it that working boys have an opportunity of continuing their education through systematic instruction given in the day time. But the American shop is so organized and administered that the German custom of setting apart certain afternoons for the instruction of apprentices seemed to the employers impracticable. We were aware of the fact that certain large corporations, such as the Baldwin Locomotive Works and the New York Central Shops, provide for the education of apprentices by establishing schools in connection with the works and employing a superintendent who sees to it that the apprentices are properly taught. But most shops are not large enough to put a plan of this kind into successful operation. Then too there are objections to corporation schools. They are apt to be thought of as operated primarily in the interest of the corporation, rather

than for the welfare of the apprentices, where there is a possibility of conflict of interest. It therefore seems a reasonable specialization for the shop to train in shop methods and discipline, and the school to supply such supplementary education as it is best qualified to give.

We were all of us more or less familiar with what Professor Schneider is doing at the University of Cincinnati. His scheme, however, has to do, not with the education of shop apprentices, but with young engineers. But there seemed to be no good reason why a similar plan might not succeed with younger and less advanced shop apprentices, and we agreed to try it out. The members of the committee were confident that employers could be found who would take boys on half-time, alternating from week to week as in Cincinnati, if the Lewis Institute would undertake to work out a curriculum for the boys that would be suited to their needs.

Having agreed to this plan of co-operation, the first question to be considered was the length of the course. It seemed to us that, in starting, a two-years' course, extending through the summers, equivalent to a continuous training of one year, would be as much as we should undertake; that in general these boys, if they were serving a four-years' apprenticeship, could be in school on half-time for two years. The employers thought they could count the two years as full years of apprenticeship. It seemed wise not to make the course too long because of chances that are liable to interrupt the work, such as removal of parents, shutting down of shops, and discontinuance of the co-operation of the shop and the school.

In considering the question of the age of the boys, we felt that with the law as it is in Illinois we should take no one under sixteen. Some of the employers were anxious that we go over twenty, while we thought that eighteen should be the limit. We compromised on the limits of sixteen and twenty.

The compensation was fixed at five dollars a week for the week the boys work and the tuition fee of fifty dollars a year, amounting in all to about seven dollars a week; so that the boys got their schooling and received at the same time ten dollars

a month. While the employers anticipate that the boys will become for them valuable workmen who can be given more responsible positions as a result of their training than would otherwise be possible, they recognize the fact that at the expiration of the two years some of the apprentices may prefer to give up the shop work and go on with their school work, which they will be at liberty to do.

In putting the plan into operation, we felt that it would be best to confine ourselves to boys who were already in the shops, who had proved their ability to do shop work, and who would come to the school on the recommendation of the employers. After a thorough canvass, we found that the firms that were interested in the co-operative course could furnish but ten boys from their own apprentices who felt that they could afford to take the smaller income which being in school on half-time involved. Places, however, could be found in these shops for forty boys, or twenty units, provided that business conditions so improved as to warrant the putting on of more help. Conditions did not improve as expected, and in September it was decided to postpone the date of starting the work from October 1, 1908, to January 4, 1909, and in the meantime to put as many boys in the shops as places could be provided for, that they might be thoroughly tried out before starting the work at school. On December 27 we had twenty-six boys working in the shops. The industrial situation was still unsatisfactory, and employers who were interested in the work were reluctant to take on more boys. On January 4 we started with twenty-eight boys enrolled, fourteen units. On January 13 we had places for ten more boys. At this time a "want ad." was placed in the *Daily News* for one issue, stating that we had places for ten boys. On the morning of January 14 sixty boys came to the Institute in answer to this advertisement. Of these about twenty were selected and requested to appear the next day in classes. During the next two or three days ten of these were sent out to the shops for a trial, eight of them being temporarily placed, increasing our enrolment to thirty-six. Throughout the remainder of the Winter Quarter individual applications were received, and in a number of cases the boys

were given a trial. In all, about twenty boys attended the Institute for a week or more who were never sent to the shops. A number of these would have made good boys for the course, but places could not be found for them at the time.

By the close of the Spring Quarter the class had been reduced to twenty-two. An advertisement was placed at this time in the *Tribune*, and about twenty boys appeared the next morning at the Institute. Only boys who were somewhat advanced in their school work could be selected at this time, and only five were secured, increasing our enrolment to twenty-seven. By the close of the first year's work the number had been reduced to twenty-four. All of these have expressed themselves as anxious to take the second year's work, and after a personal interview with each one we feel quite certain that twenty of the twenty-four fully intend to complete their time as apprentices in the shop after the expiration of the co-operative course.

Of the twenty-four boys who completed the first year's work eleven were recommended to us by the shops and thirteen were recommended to the shops by the Institute. Of the twenty-seven who have dropped out of the course, three were recommended by the shops and twenty-four were secured by the Institute, for the most part through advertisements. This includes all who were sent out for a trial, most of whom were not regularly enrolled. It appears, therefore, that boys who are already apprentices are more likely to succeed than the boys who are otherwise obtained.

Of the twenty-seven who have dropped out, eight were dissatisfied with shop conditions, eight did not show a proper interest in the work, three were unable to make a satisfactory record at school, one could not afford to continue the course, one left because of the removal of his parents, and the remainder for reasons that are not known.

Of the twenty-four boys now in the course, two are nineteen years old, ten are eighteen, nine are seventeen, and three are sixteen. Two had completed the sixth grade, two the seventh grade, nine the eighth grade, six one year of high school, three two years of high school, one three years of high school, and one

had completed a four-year high-school course. A number of the boys had been out of school for some time, and some of them had attended evening school. The boys worked well together. Those who had been at work had acquired a sort of knowledge that made it possible for them to hold their own with their companions who were more advanced in school. Then too the work was of quite a different character from what is usually given in high schools. The mathematics, for instance, was a combination of arithmetic, algebra, geometry, and trigonometry.

The curriculum as at present arranged for the first half-year is as follows: The boys begin the day at 8:30 with laboratory work in physics, a subject which they are sure to be interested in when presented, as it is in the Institute, with emphasis on the applications to the mechanic arts. At 9:30 they meet with our large high-school class in physics for the demonstration lecture. At 10:30 they go to the teacher of mathematics, who keeps in touch with what the boys are doing in physics and in the shops, and gives them the instruction they need to help them in their other work. At 11:30 they go to the teacher of English, who requires them to write themes on the work of the shops and to discuss topics of current interest to young workers. In the afternoon the boys spend two hours in the drafting-room and two hours in the shops of the Institute, that they may understand the relation of the work which they are doing outside of the Institute to other shop processes.

The work of the Summer Quarter for first-year boys was confined to a single subject, chemistry, which was presented by means of demonstration lectures, laboratory experiments, and textbook work for from six to eight hours a day.

The curriculum for the Autumn Quarter was similar to that of the Winter and Spring. The curriculum as planned for second-year boys is along the same general lines, except that in the Summer Quarter the forenoons will be devoted to electricity, engineering principles, and practical mathematics, and the afternoons to laboratory work in testing machinery and strength of materials.

After a year's trial all are agreed that we are on the right

track. The boys want to continue. Most of those who have completed the year's work have developed into promising young workmen. The school has counteracted certain shop influences that often work to the disadvantage of apprentices, and the shops, on the other hand, have given the boys a training that makes the school work more real and effective than it otherwise would be. We are agreed that the boys are more manly and better equipped than they would be likely to be if they had spent the entire time either in the shop or in the school.

The coming together in occasional conferences of the employers and the instructors of the boys has shed much light on the needs of the shops and the aims of the school. This is a phase of the co-operation of school and shop the importance of which cannot be overestimated. On the evening of December 15 the boys and their employers and instructors met together at a dinner at the Institute. The boys organized a society to be made up of all in the co-operative course. They were addressed by a number of the employers, after which the employers and instructors held an important conference. Provision was made for a new co-operative class of forty to begin work in the Institute at the opening of the Winter Quarter. As a result of the meeting a change in the method of paying the boys was decided upon, and is as follows:

On each alternate week the shop apprentices are sent to the Institute for five school days of eight hours each and report to the shop on Saturday. In computing wages, the school week is counted equivalent to the regular shop week. First-year boys are paid weekly at the rate of seven cents an hour. Second-year boys may be paid weekly at the rate of nine cents an hour. Boys who are already employed as apprentices may receive weekly wages at a rate equivalent to one-half the hourly rate they are earning at the time of entering the course, plus two cents an hour, this two cents an hour being sufficient to cover the cost of tuition. The Institute reports to the employer weekly the time spent in school, all time lost being deducted from the boy's wages at the regular rate per hour.

It was contemplated that the boys should pay tuition amount-

ing to fifty dollars a year out of their earnings, but Mr. La Verne W. Noyes, who has had six of the boys in the shops of the Aeromotor Company, has generously offered to pay the tuition of all boys in the co-operative course who do satisfactory work in both the shop and the school. Mr. Noyes has thus shown his appreciation of what has been done, and has made it possible for boys to become competent workmen who might otherwise feel obliged to do work which qualifies them for nothing in particular and offers no opportunity for advancement.

Many have worked together to make successful this experiment in the co-operation of school and shop in promoting industrial efficiency. Credit is due especially to Mr. Paul Blatchford, secretary of the Chicago branch of the National Metal Trades Association, who has interested the manufacturers and induced them to co-operate with the Institute in the education of their apprentices. Mr. Charles E. Hoyt, instructor in foundry work in the Institute and secretary of the National Foundry Foremen's Association, has made frequent visits to the shops, has found places for the boys, and has kept in touch with them and their employers.